



Diagnoses and Diagnostic Modalities for Pediatric Patients with Elevated Troponin

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Background

Emergent care of adults with atherosclerotic coronary artery disease (CAD) is based on troponin levels

- "Door-to-balloon time" initiatives exist in ER to proceed to catheterization lab ASAP

This has led to troponin levels being drawn in pediatric patients with increasing frequency. Referral centers receive patients with elevated levels, however it is unclear:

- If etiology of elevation in pediatric patients differs
- What is the optimal profile of cardiac testing in this population
- Whether emergent left heart catheterization based on elevated troponin values is indicated

Hypotheses

1. Pediatric patients with elevated troponins are not likely to have CAD and thus do not need emergent left heart catheterization
2. Troponin elevations in children are due to more heterogeneous causes than in adults
3. Cardiac MRI could be more useful in elucidating and confirming a diagnosis than right or left heart catheterization.

Methods

- Retrospective Chart Review
- 10 years of patients 1/1/2002-12/31/2011
- Inclusion Criteria:
 - Any elevated troponin value at CMH and <20 years old
 - Known minor CHD including left to right shunts, resolved lesions, or if no known lesion at time of presentation
- Exclusion Criteria: (Figure 1)
 - Cardiac surgery within the last year.
 - "Significant" CHD (cyanotic disease, residual shunts, or heart transplant)
 - Neonates in the NICU
 - ECMO
- Testing was defined as
 - "Useful in Making Dx" made a clear diagnosis, changed the presumptive diagnosis and/or altered management
 - "Useful in Confirming Dx" supported the presumptive diagnosis and/or gave clarifying information. Did not alter management plan
 - "Not useful" Did not add to diagnosis or management.

Results

Figure #1- Patient Population

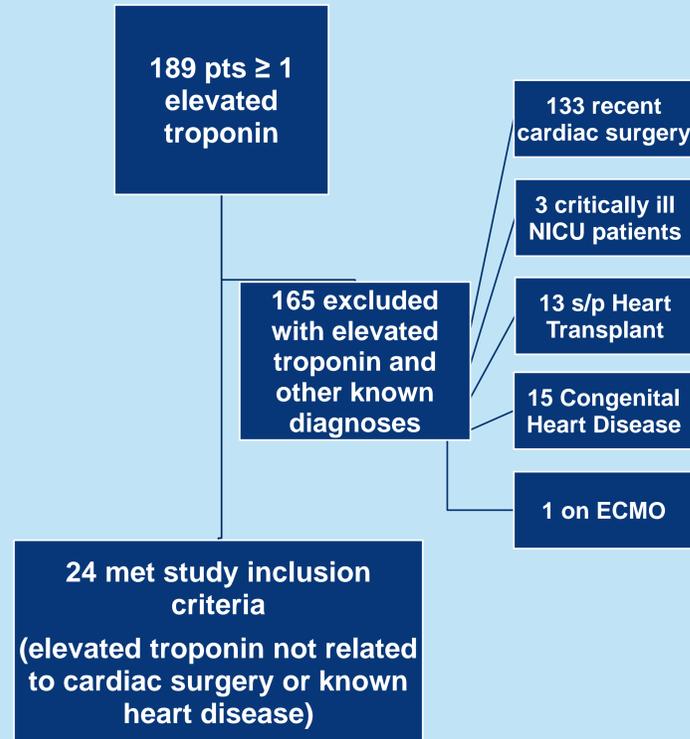


Table #1- Demographics

Age, median (range)	8.5 years (1 mo-19yr)
Male	15 (62.5%)
Place of Presentation	
OSH ED	21 (87.5%)
CMH ED	3 (12.5%)
Max Troponin, median (range)	3.06 (0.48-354)
Time to Neg. Troponin, median (range)	5 days (1-26)
Past Medical Hx	Cancer- 4 (16.7%) SLE- 1 (4.2%)
Family Hx	Cardiomyopathy- 1 (4.2%) Non-contributory- 23 (95.8%)
Chief Complaint	
Chest Pain	9 (37.5%)
Heart Failure Symptoms	5 (21%)
Other	10 (42%)

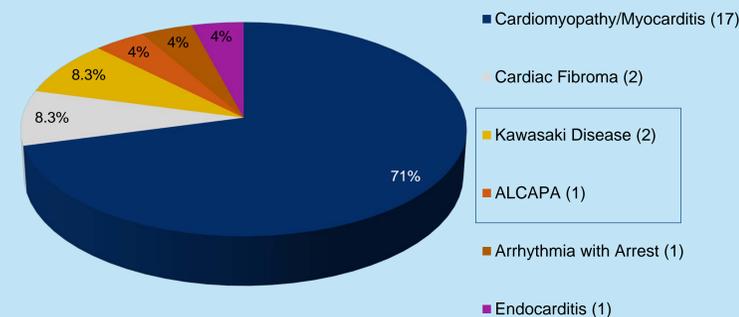
Table #2- Tests ordered

Test	# (% of cases)
EKG	22 (91.6%)
CXR	23 (95.8%)
Echocardiogram	24 (100%)
Right Heart Cath	14 (58.3%)
Left Heart Cath	10 (41.6%)
Cardiac MR	9 (37.5%)

Results

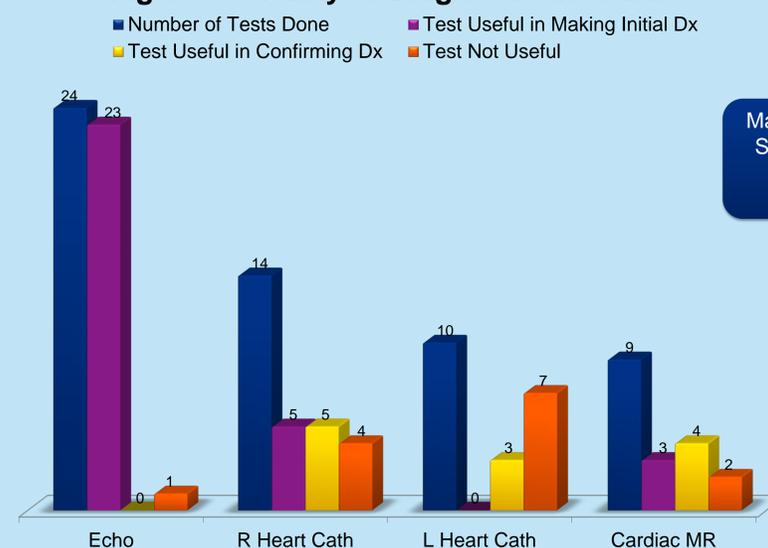
- EKG, CXR and Echo were routinely used (Table #2)
- 17/24 patients (71%) had a final diagnosis of myocarditis or cardiomyopathy (Figure #2)
- Only 3 pts had coronary disease; a 6 month old with ALCAPA and 2 pts with Kawasaki Disease (boxed)

Figure #2 Final Diagnosis



- Figure #3 shows the utility of diagnostic testing
- 23/24 diagnoses made or suspected correctly by ECHO
 - Right heart catheterization was completed in 14/24 pts and contributed to the diagnosis in 10/14.
 - Left heart catheterization was completed in 10/24.
 - In no case did left heart catheterization make or change diagnosis
 - Confirmed the suspected diagnosis in 3
 - No catheter based interventions
 - Cardiac MRI was done in 9/24 cases.
 - Helped make or confirm the diagnosis in 7/9
 - Helped in all 5 cases of suspected myocarditis

Figure #3 Utility of Diagnostic Modalities

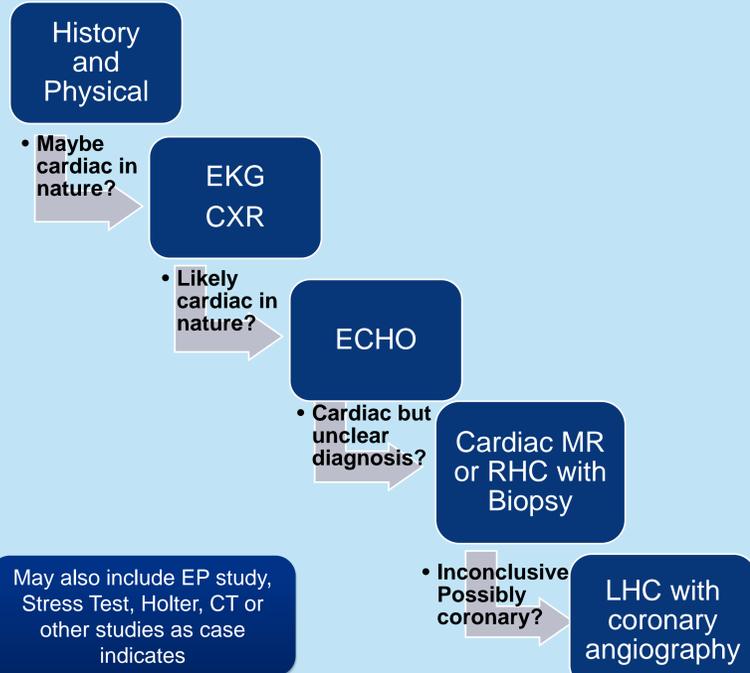


Limitations

- Retrospective chart review at a single institution
- Difficult to interpret diagnostic utility based on review of chart
- Small n while looking for rare events
- No OSH troponin data
- Only lab data was from our hospital
- We assumed if troponin positive at OSH, repeat would have been done at our hospital

Conclusions

Our results confirm that children differ from adults with elevated troponins. Pediatric patients with elevated troponin most often will have myocarditis or cardiomyopathy and rarely have coronary-related ischemia. Diagnosis may be made through EKG, CXR, and Echo and is not routinely aided by left heart catheterization with coronary angiography. Focused use of right or left heart catheterization and MRI are useful to confirm the existing clinical diagnosis, encouraging a step-wise, selective approach. Pediatric patients with elevated troponins rarely need emergent coronary catheterization for intervention in contrast to their adult counterparts.



References

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